

APPENDIX II. U.S. RESIDUE LIMITS FOR VETERINARY DRUGS AND UNAVOIDABLE CONTAMINANTS IN MEAT, POULTRY, AND EGG PRODUCTS

This appendix provides information on the residue limits (tolerances) for animal drugs and unavoidable contaminants in meat, poultry, and egg products. The Food Safety and Inspection Service in its regulatory programs apply tolerances, which are set by the Food and Drug Administration (FDA). The official source of these tolerances is Title 21 of the Code of Federal Regulations (CFR): those for animal drugs are found in CFR, Title 21, Part 556; and those for unavoidable contaminants are found in CFR, Title 21 CFR, Part 109, Section 109.30. This Appendix supplies the relevant citation for each tolerance and action level.

The tolerances and action levels for the various tissues in meat, poultry and egg products are listed alphabetically by compound in Table A II, *Residue Limits for Veterinary Drugs, and Unavoidable Contaminants*. These tolerances may be for the parent compound (the original chemical form of the compound given to the animal), or for the compound's metabolites (the chemical forms into which the compound is metabolized by the animal), or for a combination of parent plus metabolites. All tolerances are provided in units of parts per million (ppm) unless otherwise noted. Please note that this appendix has been generated for the convenience of the reader, and if any discrepancies arise between this appendix and the CFR, the values from the latter source should be used.

Table A II
Residue Limits for Veterinary Drugs, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
2-Acetylamino-5-nitrothiazole	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.1 ²	21 CFR 556.20
Aklomide	Cattle Goats Hogs Horses Poultry Sheep Eggs	3	4.5		4.5			21 CFR 556.30
Albendazole ³	Cattle Goats Hogs Horses Poultry Sheep Eggs		0.05 0.05		0.2 0.25			21 CFR 556.34
Amoxicillin	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.01	21 CFR 556.38
Ampicillin	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.01 0.01	21 CFR 556.40
Amprolium	Cattle Goats Hogs Horses Poultry Sheep Eggs	2.0	0.5 0.5 ⁴		0.5 1 ⁴	0.5 1 ⁵	 4 ⁶ , 8 ⁷	21 CFR 556.50
Apramycin	Cattle Goats Hogs Horses Poultry Sheep Eggs					0.1		21 CFR 556.52

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Arsenic	Cattle Goats Hogs Horses Poultry ⁵ Sheep Eggs	0.5	0.5	0.5	2	2		21 CFR 556.60
			0.5	2				
Bacitracin	Cattle						0.5	21 CFR 556.70
	Goats						0.5	
	Hogs						0.5 ⁸	
	Horses Poultry Sheep Eggs						0.5 ⁶	
Bambermycin	Cattle ⁹							
	Goats							
	Hogs ⁹							
	Horses							
	Poultry ⁹							
	Sheep Eggs							
Buquinolate	Cattle	0.4	0.1		0.4	0.4		21 CFR 556.90
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep Eggs							
Carbadox	Cattle				0.03			21 CFR 556.100
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep Eggs							
Ceftiofur ¹⁰	Cattle		1		2	8		21 CFR 556.113
	Goats		1		2	8		
	Hogs							
	Horses							
	Poultry							
	Sheep Eggs							
Cephapirin	Cattle						0.1	21 CFR 556.115
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep Eggs							

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Chlorhexidine	Cattle						0	21 CFR 556.120
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
	Eggs							
Chlortetracycline ¹¹	Cattle	12	2		6	12	0.4 ⁶	21 CFR 556.150
	Goats							
	Hogs	12	2		6	12		
	Horses							
	Poultry	12	2		6	12		
	Sheep	12	2		6	12		
	Eggs							
Clopidol ⁵	Cattle		0.2		1.5	3	0.2	21 CFR 556.160
	Goats		0.2		1.5	3		
	Hogs							
	Horses							
	Poultry		5		15	15		
	Sheep		0.2		1.5	3		
	Eggs							
Clorsulon	Cattle		0.1		1			21 CFR 556.163
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
	Eggs							
Cloxacillin	Cattle						0.01	21 CFR 556.165
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
	Eggs							
Colistimethate	Cattle							21 CFR 556.167
	Goats							
	Hogs							
	Horses							
	Poultry ⁹							
	Sheep							
	Eggs							
Decoquinatate	Cattle	2	1	2	2	2		21 CFR 556.170
	Goats	2	1	1	1	2		
	Hogs							
	Horses							
	Poultry ¹²	2	1	2	2	2		
	Sheep							
	Eggs							

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Dichlorvos	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.1	21 CFR 556.180
Diclazuril	Cattle Goats Hogs Horses Poultry ¹² Sheep Eggs	1	0.5		3			21 CFR 556.175
Dihydro-streptomycin	Cattle Goats Hogs Horses Poultry Sheep Eggs	0.5 0.5	0.5 0.5	0.5 0.5	0.5 0.5	2.0 2.0		21 CFR 556.200
3,5-Dinitrobenzamide	Cattle Goats Hogs Horses Poultry ¹² Sheep Eggs						0	21 CFR 556.220
Doramectin	Cattle Goats Hogs Horses Poultry Sheep Eggs		0.03		0.1 0.16			21 CFR 556.225
Enrofloxacin	Cattle Goats Hogs Horses Poultry Sheep Eggs		0.3 ⁵		0.1 ¹³			21 CFR 556.228

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Eprinomectin	Cattle Goats Hogs Horses Poultry Sheep Eggs		0.1		4.8			21 CFR 556.227
Erythromycin	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.1 0.1 0.125 ⁵ 0.025 ⁶	21 CFR 556.230
Estradiol benzoate and related esters ¹⁴	Cattle Goats Hogs Horses Poultry Sheep Eggs	480 600	120 120		240 600	360 600		21 CFR 556.240
Ethopabate	Cattle Goats Hogs Horses Poultry Sheep Eggs		0.5		1.5	1.5		21 CFR 556.260
Ethoxyquin	Cattle Goats Hogs Horses Poultry Sheep Eggs	5 5 5 5 3 5	0.5 0.5 0.5 0.5 0.5 0.5		3		0.5 ⁶	21 CFR 172.140
Famphur	Cattle Goats Hogs Horses Poultry Sheep Eggs	0.1	0.1	0.1				21 CFR 556.273

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Fenbendazole	Cattle		0.4		0.8			21 CFR 556.275
	Goats		0.4		0.8			
	Hogs		2		6			
	Horses							
	Poultry ²			2		6		
	Sheep							
Eggs								
Fenprostalene	Cattle ⁹							21 CFR 556.277
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
Eggs								
Florfenicol	Cattle		0.3		3.7			21 CFR 556.283
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
Eggs								
Flunixin meglumine	Cattle		0.025		0.125			21 CFR 556.286
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
Eggs								
Furazolidone	Cattle						0	21 CFR 556.290
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
Eggs								
Gentamicin sulfate	Cattle	0.4	0.1		0.3	0.4		21 CFR 556.300
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep						0.1 ⁵	
Eggs								

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Halofuginone hydrobromide	Cattle Goats Hogs Horses Poultry Sheep Eggs				0.16 ¹² , 0.13 ²			21 CFR 556.308
Haloxon	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.1	21 CFR 556.310
Hygromycin B	Cattle Goats Hogs Horses Poultry Sheep Eggs						0 0 0 ⁶	21 CFR 556.330
Ivermectin	Cattle Goats Hogs Horses Poultry Sheep Eggs		0.01 0.02		0.01, 0.015 ¹⁵ 0.02 0.03			21 CFR 556.344
Lasalocid	Cattle Goats Hogs Horses Poultry Sheep Eggs ⁹ Rabbit	0.2 ¹⁶			0.7 0.4 ⁵ 0.7			21 CFR 556.347
Levamisole hydrochloride	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.1 0.1 0.1	21 CFR 556.350

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Lincomycin	Cattle Goats Hogs Horses Poultry ¹² Sheep Eggs		0.1		0.6			21 CFR 556.360
Maduramicin ammonium	Cattle Goats Hogs Horses Poultry Sheep Eggs	0.38 ¹²						21 CFR 556.375
Melengestrol acetate	Cattle Goats Hogs Horses Poultry Sheep Eggs	0.025						21 CFR 556.380
Metoserpate hydrochloride	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.02 ⁵	21 CFR 556.410
Monensin	Cattle Goats Hogs Horses Poultry ^{9,17} Sheep Eggs						0.05 0.05	21 CFR 556.420
Morantel tartrate ¹⁸	Cattle Goats Hogs Horses Poultry Sheep Eggs				0.7 0.7			21 CFR 556.425

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Moxidectin	Cattle Goats Hogs Horses Poultry Sheep Eggs		0.05		0.2			21 CFR 556.426
Narasin	Cattle Goats Hogs Horses Poultry Sheep Eggs	0.48 ¹²						21 CFR 556.428
Neomycin	Cattle Goats Hogs Horses Poultry Sheep Eggs	7.2 7.2 7.2 7.2 7.2	1.2 1.2 1.2 1.2 1.2		3.6 3.6 3.6 3.6 3.6	7.2 7.2 7.2 7.2 7.2		21 CFR 556.430
Nequinatate	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.1 ⁵	21 CFR 556.440
Nicarbazin	Cattle Goats Hogs Horses Poultry ¹² Sheep Eggs	4 ¹⁹	4		4	4		21 CFR 556.445
Novobiocin	Cattle Goats Hogs Horses Poultry Sheep Eggs						1 1	21 CFR 556.460
Nystatin	Cattle Goats Hogs Horses Poultry Sheep Eggs	0					0 0	21 CFR 556.470

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Oleandomycin	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.15 0.15 ⁶	21 CFR 556.480
Ormetoprim	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.1	21 CFR 556.490
Oxfendazole	Cattle ²⁰ Goats Hogs Horses Poultry Sheep Eggs				0.8			21 CFR 556.495
Oxytetracycline	Cattle Goats Hogs Horses Poultry ⁶ Sheep Eggs	12 12 12 12	2 2 2 2		6 6 6 6	12 12 12 12		21 CFR 556.500
PCB's ²¹	Cattle Goats Hogs Horses Poultry Sheep Eggs	3 3 3 3 3 3						21 CFR 109.30
Penicillin	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.05 0 0 ²² , .01 ² 0	21 CFR 556.510
Pirlimycin	Cattle Goats Hogs Horses Poultry Sheep Eggs	0.3			0.5			21 CFR 556.515

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Progesterone	Cattle Goats Hogs Horses Poultry Sheep Eggs	0.012	0.003		0.006	0.009		21 CFR 556.540
		0.015	0.003		0.0015	0.015		
Pyrantel tartrate	Cattle Goats Hogs Horses Poultry Sheep Eggs		1		10	10		21 CFR 556.560
Ractopamine hydrochloride	Cattle Goats Hogs Horses Poultry Sheep Eggs		0.05		0.15			21 CFR 556.570
Robenidine hydrochloride	Cattle Goats Hogs Horses Poultry ¹² Sheep Eggs	0.2 ¹⁶					0.1 ⁵	21 CFR 556.580
Sarafloxacin	Cattle Goats Hogs Horses Poultry ^{5,9} Sheep Eggs							21 CFR 556.594
Spectinomycin	Cattle Goats Hogs Horses Poultry ¹² Sheep Eggs		0.25			4		21 CFR 556.600
							0.1	

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Streptomycin	Cattle	0.5	0.5	0.5	0.5	2	0.5	21 CFR 556.610
	Goats							
	Hogs	0.5	0.5	0.5	0.5	2	0.5	
	Horses							
	Poultry ¹²	0.5	0.5	0.5	0.5	2	0.5	
	Sheep							
	Eggs							
Sulfabromomethazine sodium	Cattle						0.1	21 CFR 556.620
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
	Eggs							
Sulfachloropyrazine	Cattle							21 CFR 556.625
	Goats							
	Hogs							
	Horses							
	Poultry ¹²						0	
	Sheep							
	Eggs							
Sulfachlorpyridazine	Cattle						0.1	21 CFR 556.630
	Goats							
	Hogs						0.1	
	Horses							
	Poultry							
	Sheep							
	Eggs							
Sulfadimethoxine	Cattle						0.1	21 CFR 556.640
	Goats							
	Hogs							
	Horses							
	Poultry						0.1	
	Sheep							
	Eggs							
Sulfaethoxy-pyridazine	Cattle						0.1	21 CFR 556.650
	Goats							
	Hogs							
	Horses							
	Poultry						0	
	Sheep							
	Eggs							

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Sulfamethazine	Cattle Goats Hogs Horses Poultry ⁵ Sheep Eggs						0.1 0.1 0.1	21 CFR 556.670
Sulfanitran	Cattle Goats Hogs Horses Poultry ¹² Sheep Eggs						0	21 CFR 556.680
Sulfaquinoxaline	Cattle Goats Hogs Horses Poultry ⁵ Sheep Eggs						0.1 0.1	21 CFR 556.685
Sulfathiazole	Cattle Goats Hogs Horses Poultry Sheep Eggs						0.1	21 CFR 556.690
Sulfomyxin	Cattle Goats Hogs Horses Poultry ⁵ Sheep Eggs						0	21 CFR 556.700
Testosterone propionate	Cattle ²³ Goats Hogs Horses Poultry Sheep Eggs	0.0026	0.0006 4		0.0013	0.0019		21 CFR 556.710

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Tetracycline ¹¹	Cattle ²⁴	12	2		6	12		21 CFR 556.720
	Goats							
	Hogs	12	2		6	12		
	Horses							
	Poultry ⁶	12	2		6	12		
	Sheep	12	2		6	12		
Eggs								
Thiabendazole	Cattle						0.1	21 CFR 556.730
	Goats						0.1	
	Hogs						0.1	
	Horses							
	Poultry ²⁵						0.1	
	Sheep							
Eggs								
Tiamulin	Cattle				0.6 ²⁶			21 CFR 556.738
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
Eggs								
Tilmicosin	Cattle		0.1		1.2			21 CFR 556.735
	Goats							
	Hogs					7.5		
	Horses							
	Poultry							
	Sheep							
Eggs								
Trenbolone	Cattle ⁹							21 CFR 556.739
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
Eggs								
Tripeleennamine	Cattle						0.2	21 CFR 556.741
	Goats							
	Hogs							
	Horses							
	Poultry							
	Sheep							
Eggs								
Tylosin	Cattle	0.2	0.2		0.2	0.2		21 CFR 556.740
	Goats							
	Hogs	0.2	0.2		0.2	0.2		
	Horses							
	Poultry							
	Sheep							
Eggs	0.2 ⁶							

Table A II - Continued
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

Compound	Species	Fat (ppm)	Meat (ppm)	Meat ¹ by-product (ppm)	Liver (ppm)	Kidney (ppm)	Edible Tissue (ppm)	Reference
Virginiamycin	Cattle ⁹ Goats Hogs Horses Poultry ⁹ Sheep Eggs	0.4	0.1		0.3	0.4		21 CFR 556.750
Zeranol	Cattle ⁹ Goats Hogs Horses Poultry Sheep Eggs						0	21 CFR 556.760
Zoalene ²⁷	Cattle Goats Hogs Horses Poultry Sheep Eggs	2 ¹²	3 ⁵		6 ¹² , 3 ²	6 ¹²		21 CFR 556.770

¹ Unless otherwise indicated meat by product includes liver and kidney

² Turkey only

³ Marker residue: albendazole 2-aminosulfone

⁴ Chicken, turkey and pheasants

⁵ Chicken and turkey

⁶ Whole egg

⁷ Egg yolk

⁸ Chicken, turkey, pheasants and quails

⁹ No tolerance required

¹⁰ Marker residue is desfuroylceftiofur

¹¹ Tolerances are for the sum of all approved tetracycline residues (i.e., tetracycline, chlortetracycline, and oxytetracycline)

¹² Chicken only

¹³ Marker desethylene ciprofloxacin

¹⁴ Tolerance in parts per trillion

¹⁵ American bison and reindeer

¹⁶ Skin with adhering fat

¹⁷ Chicken, turkey, and quail

¹⁸ N-methyl-1,3-propanediamine

¹⁹ Skin

²⁰ Marker residue is fenbendazole

Table A II - *Continued*
Residue Limits for Veterinary Drugs, Food Additives, and Unavoidable Contaminants
2002 FSIS National Residue Program

²¹ Action levels

²² Chicken, pheasants, and quail

²³ Heifers; no residues are permitted at concentrations above these, which represent the levels naturally present in untreated animals

²⁴ Calves

²⁵ Pheasants only

²⁶ Marker residue: 8-alpha-hydroxymutillin

²⁷ Tolerances are established for residues of zoalene (3,5-dinitro-o-toluamide) and its metabolite 3-amino-5-nitro-o-toluamide